



Patent Application of

Alexei Lebedev

for

**TITLE: AN EQUITIES INFORMATION AND VISUALIZATION SYSTEM THAT PROCESSES  
ORDERS AS INFORMATION IS RECEIVED VIA DATA FEED IN REAL-TIME**

**CROSS REFERENCE TO RELATED APPLICATIONS:** Not Applicable

**ASSIGNEE:** Magic Works LLC

**FEDERALLY SPONSORED RESEARCH:** Not Applicable

**SEQUENCE LISTING OR PROGRAM:** Not Applicable

**BACKGROUND OF INVENTION--FIELD OF THE INVENTION**

The present invention generally relates to computer systems for trading and analyzing selected equities, and more particularly, software that displays securities trading information and order placement from various alternative trading systems ("ATS"), such as electronic communication networks ("ECN"), and NASDAQ.

**BACKGROUND OF THE INVENTION**

There are currently three primary types of computer accessible trading systems for securities such as stocks, bonds, commodities and derivatives. The first is the conventional stock exchange system exemplified by the New York Stock Exchange and New York Mercantile Exchange.

The second system is electronic exchanges. Electronic exchanges utilize electronic access of

dealer posted market prices without a negotiating specialist or floor based exchange. The largest of these is NASDAQ. It is a totally computer-based market where each member dealer can make its own market in the stocks traded on the exchange through a computer network.

The best bid to buy by and the best offer to sell for a security is called the security's "inside market." NASDAQ supplies trading data to the participants via a computer network at three different service levels, known as Level I, Level II and Level III. Level II allows real-time access to the following data: (1) Inside market quotes (highest bid and lowest offer) for listed securities, (2) individual market maker quotations, as well as inside quotes for OTC Bulletin Board listed securities, (3) trade price and volume data. Level III is a service limited to member dealers, allowing them to provide NASDAQ with their best bid and offer for securities in which they make markets, and receive incoming orders. There are various systems for displaying Level II and III data, such as disclosed in U.S. Pat. No. 5,297,032 to Trojan et al., issued Mar. 22, 1994.

The third trading system is alternative trading systems ("ATS") which provide ATS members and electronic exchange users, such as NASDAQ users; an electronic network by which they may display and execute their orders independent of a market maker or specialist. By doing so, members avoid conventional fees while enjoying more current and complete market information. ATSs are presently regulated under SEC Rule 17(a)(3) and 17(a)(4) as they apply to broker/dealer internal trading systems. Currently the most popular ATSs are ECNs. There are currently more than five ECNs. Island, Instinet, Archipelago, B-trade, Brut etc.

Each member of an ECN has a trading terminal that is connected with the ECN's central order book computer. Members display their bids and offers and conduct transactions through the resulting network. The ECN's order book computer keeps track of bid/offer information including price, volume, and execution for each open and closed transaction as supplied to it in real time by its members. The order book computer also records which computer, and thus, which member posted each bid or offer. Once a bid is hit or an offer is taken through the central order book computer, the central order book and members' trading terminals are thus updated and the

accepted bids and offers are no longer displayed.

In a conventional stock exchange or an electronic exchange, buyers and sellers are subjected to intermediaries in the transaction, i.e., respectively the specialist or the market maker dealing in a particular security. However, in an ECN, each bid and offer is a discrete and anonymous order, fully viewable by and accessible to all its members.

The member controls through its trading computer all aspects of trading securities including order entry, price, volume, duration and cancellation. The member may, at its discretion, select desirable transactions from all open orders available as displayed from the ECN's central order book. The member may choose from the inside market for the security or at a worse price outside of the inside market. Such freedom is highly desirable. For example, it may be a wise strategy to buy securities at a price equal to or higher than the best offer in order to obtain more shares than the inside offer is displaying. This strategy also recognizes that the inside market is moving quickly and may not be available when trying to take the best offer.

All the open orders, trades and market fluctuations are being updated constantly and a market feed consisting of a series of these updates is sent to each subscriber. There is however the monumental problem of displaying this information in a way that could be interpreted by the trader to create a mental picture of the fluctuating market. The trader has a difficult time deciphering what other participants are doing, what a good price for a buy or a sell order would be, which market to send that order to, and in case of larger orders, what size to specify for the order to convey the right information.

In patent 6,278,982 granted to Richard A. Korhammer of Lava Trading Inc. a display is presented consisting of a sorted list of orders inside a window dedicated to the particular stock symbol. The list shows the market participant ID, order size, and order price. Buy orders are listed on the left, and sell orders on the right.

The best bid and offer are on the top, with other participants' quotes (with less favorable prices) shown below. As order records arrive, this display is updated. A modern computer has no

problem keeping up with the market feed, and can display a dozen of these order books with less than 1% of CPU used.

Trade records are not reflected in this display, and are usually displayed in a scrolling list on the side.

It can be difficult to keep track of what's going on by looking at flickering lines of quotes moving around as trades occur, new orders are added, and old orders cancelled and removed. Some typical enhancements include the following:

Orders are divided by price, and orders with the same price grouped to one line. When two orders are grouped, their sizes are added up. The background color can also be used to show the grouping of orders by price. The trader can set the order book's parameters to see a quote from a particular market center on top, regardless of price.. The color coding could be set to display orders grouped by size instead (orders accounting for the first 10,000 shares are colored green, the next 10,000 shares are red, etc.)

## BACKGROUND OF INVENTION-OBJECTS AND ADVANTAGES

It is an object of the present invention to provide a system for graphically visualizing orders and trades of a market or several markets in real-time

It is further an object of the present invention to display each order, quote or trade on a two-dimensional scrolling canvas as a distinguished graphical mark. The Y coordinate corresponds to price and the X coordinate indicates the time of the event, such as when the trade took place, an order was entered and removed from the market

An additional object of the present invention is allowing a trader, through varying zoom levels to view various price and time scales of the market.

Another object of the present invention is allowing the trader to enter orders by interacting with the screen where a special graphical mark represents the order currently being composed, and adjusting the intended price or time of order placement by means of mouse, keyboard or joystick.

Yet another object of the present invention is to provide varying visual attributes, such as extent thickness, color or variation in shape of each graphical mark representing an attribute such as order intention (buy or sell), order age, order size, the type of trade, or trade volume

A further object of the present invention is to display the trader's own active and recent orders and trades alongside the other participants' orders in a way that distinguishes them from the rest and allows the trader to make a visual comparison.

An additional object of the present invention is to provide a system of graphically visualizing order books of multiple markets as vertical bands with each band displaying orders originating from a specific market, and the price of each order being indicated by the Y coordinate of its distinguished graphical mark.

It is an object of the present invention to provide the trader with the ability to enter orders targeted to a specific market center by moving a special graphical mark inside a corresponding vertical band. The vertical movement being used to adjust the limit price.

It is a further object of the present invention to give trader ability to have his order sent, cancelled and re-sent to the market by predetermined user action. The trader can do so by the pressing of a joystick button or keyboard key, and interactively, whenever the price, size or any other parameter of the composed order changes.

Yet another object of the present invention is to give the trader ability to enter orders that will be

automatically routed to a market center of the system's choice. The trader clicks in a special auto-route band and the computer chooses a destination with the fastest response time, and the best price.

These and other objects are achieved in the present invention consisting of a computer system where the order book is displayed graphically. In our visualization each order is shown as a horizontal line with the Y coordinate representing the price and the X coordinate representing time. The line extends from the point where the order was received to the point when it was removed, or to the edge of the screen if the order is currently active. The order book is thus represented as a collection of disjointed lines each representing an order. This allows the trader to observe the dynamics of the market.

The trade records are shown as points (events) on the same mapping scheme as the order records. In the traditional display the trader had to scan the trade record list and the order book to determine where relative to the BBO (National best bid and offer) trades were taking place. At any point in time the actual price of a security was not known to anyone. All one could determine was that the security could be bought at the best offer price and sold at the best bid price. The space between the bid and offer was the uncertainty region. Our trade record displays all the trades happening at any given time and thus can show the trader that when enough trades occur on the bid side the price goes down and when enough trades occur on the offer side the price goes up. Thus the present invention locates the true price to a greater precision.

The system allows the trader to interact with the market instantaneously by means of a graphic user interface that allows him to enter orders, make trades and cancel orders by a mere click of a button. The trader can thus respond to fluctuations in security price with a superior knowledge of where the market is headed.